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NEW AND LITTLE KNOWN MEXICAN AND NEOTROPICAL DELTOCEPHALINAE (HOMOPTERA: CICADELLIDAE)

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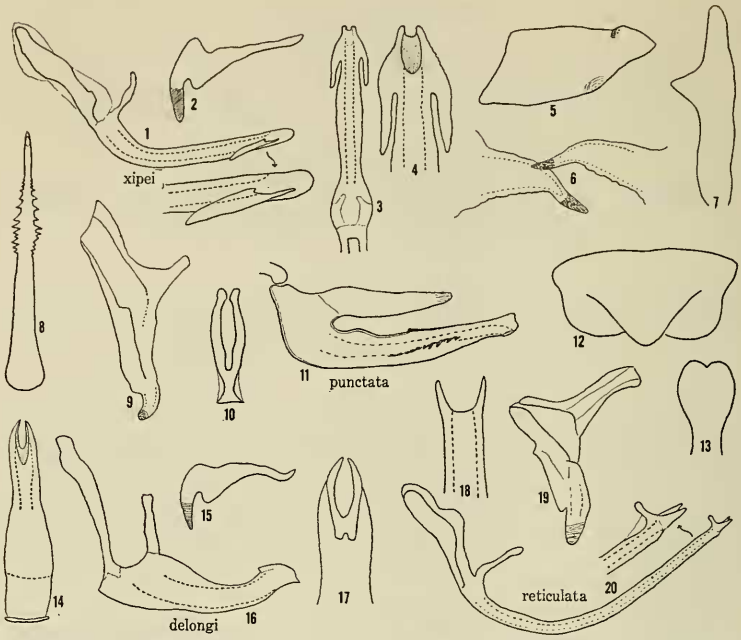
The deltocephaline leafhoppers of the Americas south of the United States are known largely through the numerous papers of D. M. DeLong and R. Linnavuori. Dr. DeLong has published extensively on various Mexican genera, whereas Dr. Linnavuori has treated those of Central and South America. For the interested student, the most valuable single paper is by Linnavuori (1959).

This paper includes descriptions of two new *Polyamia,* three new *Deltocephalus,* one new *Sanctanus,* and a new genus, *Bolotheta,* for *Neocoelida punctata* Osborn and *Coelidiana rotundiceps* Linnavuori and Heller. *Maricaona reticulata* Linnavuori is transferred to *Polyamia,* and the male genitalia of this species are illustrated for the first time. The combination *Sanctanus lepidellus* (Stål) is reinstated, and a description of the previously unknown male is included. The types of all new species are in the collection of the U. S. National Museum.

Polyamia arachnion, new species

Length: 3.4 mm.

Coloration: Venter brown; legs light brown marked with darker areas. Face light brown, heavily marked with dark brown or black arcs on upper portion of clypeus, large ill-defined dark area at each antennal base, each lorum bordered and laterally bisected by a brown area, clypellus marked with a basal transverse band and an apical subtriangular spot of dark brown. Crown light brown with anterior marginal markings consisting of a pair of dark arcs extending up from clypeus and a minute pair of apical spots and a single quadrangular dark-brown spot flanking each ocellus mesally. On either side the minute apical spot and quadrangular spot are connected to each other and to the coronal suture by a triradial reddish-brown mark.



FIGS. 1–20. *Deltocephalus xipei*: 1, lateral view of connective and aedaegus; 2, distal portion of style shown ventrally; 3, ventral view of aedeagus; 4, distal portion of aedeagus shown dorsally. *Bolotheta punctata*: 5, lateral view of pygofer (setae omitted); 6, ventral process of pygofer; 7, dorsal view of pygofer; 8, ventral view of aedeagus; 9, ventral view of style; 10, ventral view of connective; 11, lateral view of aedeagus. *Polyamia* sp.: 12, pregenital sternum; 13, ventral outline of first valvulae. *Deltocephalus delongi*: 14, ventral view of aedeagus; 15, distal portion of style shown ventrally; 16, lateral view of connective and aedeagus; 17, distal portion of aedeagus shown dorsally. *Polyamia reticulata*: 18, distal portion of aedeagus shown ventrally; 19, dorsal view of style; 20, lateral view of connective and aedeagus.

Additional markings on crown consist of a narrow reddish area around each ocellus, an irregular dark-brown spot behind each ocellus, and a pair of right-angular dark-brown marks at center of disc. Some ill-defined lighter areas on disc as well. Pronotum light brown marbled anteriorly and mesally with various lighter and darker hues. Scutellum light brown with anterior angles, a pair of anterior spots, and a cruciform mark dark brown. Forewings brown hyaline, light-brown veins sharply distinct due to dark infuscations at borders of cells.

Male genitalia: Aedeagus in lateral view stoutest basally, shaft greatly narrowed, and with apical portion asymmetrically elaborated (Fig. 30). Aedeagus in ventral view almost uniform in width with asymmetrical apex deeply cleft (Fig. 32). Gonopore opens at base of apical cleft. Mesal lobe of style widened distally and subtruncated at apex (Fig. 31).

Female genitalia: Females not definitely associated with male holotype.

Type: Holotype (USNM Type No. 66348) male, Chapingo (east of Mexico City), Mexico, 11 April 1957, Gibson and Carillo.

Discussion: This species together with *gangamon* n. sp. and *reticulata* (Lnv.) form a compact species–group within *Polyamia*. In all three species, the forewings are reticulated by many extra veinlets, particularly in the claval area.

Polyamia gangamon, new species

Length: 3.4–3.5 mm.

Coloration: Not distinguishable from *arachnion*.

Male genitalia: Aedeagus in lateral view uniformly very narrow, rapidly upturned distally, and with a distinct, sharp, decumbent preapical dorsal tooth (Fig. 26). Gonopore opens at base of sharply and deeply forked apex (Fig. 25). Mesal lobe of style blunt apically (Fig. 24).

Female genitalia: Females not definitely associated with male holotype.

Types: Holotype (USNM Type No. 66349) male, Cuernavaca-Acapulco Road, Mexico, 23 August 1936. Ball and Stone. Paratype male, Paricutín, Mexico, 28 November 1944, W. F. Foshag.

Polyamia reticulata (Linnavuori), new combination

Maricaona reticulata Linnavuori 1959: 98.

Length: 3.3 mm.

Coloration: Not distinguishable from *arachnion*.

Male genitalia: Aedeagus in lateral view uniformly very narrow, rapidly upturned distally, and with a short, blunt projection near apex (Fig. 20). Gonopore opens at base of moderately deep forked apex (Fig. 18). Style undistinguished (Fig. 19).

Female genitalia: Females not definitely associated with male holotype.

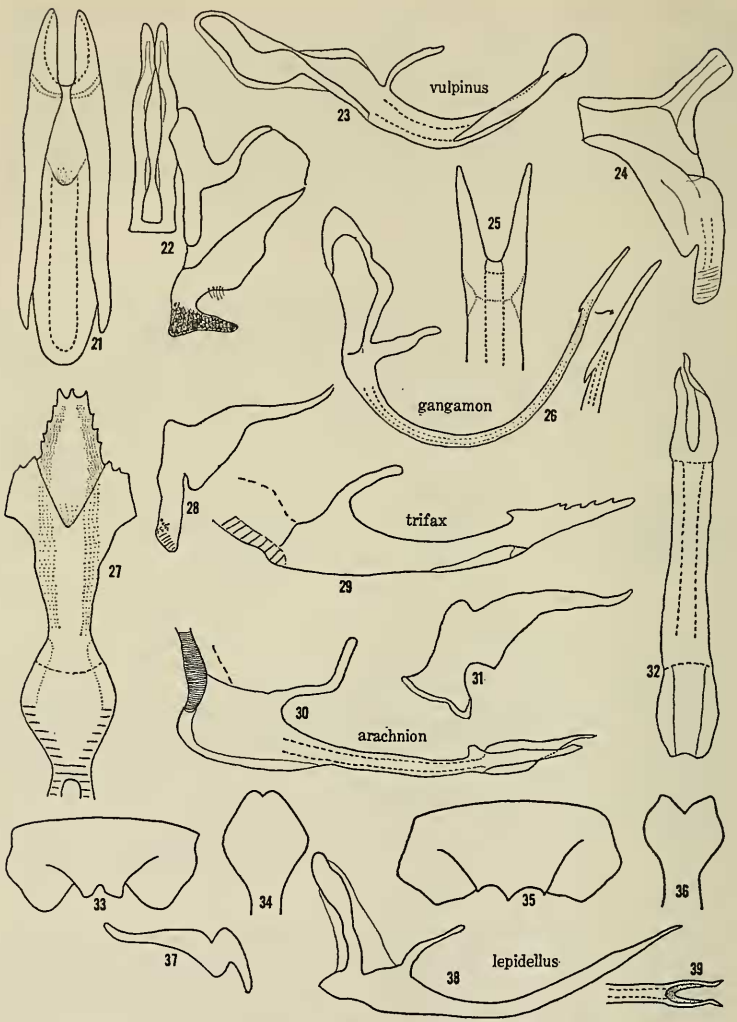
Types: Holotype (USNM Type No. 66350). Paricutín, Mexico, 28 November 1944, W. F. Foshag.

Discussion: Linnavuori's type series was mixed and contained at least two species. The male genitalia were not illustrated with the original description. The drawings used here were prepared from the holotype in the U. S. National Museum collection. The generic transfer to *Polyamia, sensu lato*, is conservative treatment.

The genus *Maricaona* Caldwell was based upon a unique female from Puerto Rico. This single female is still the lone representative of the genus. Without a conspecific male, a generic evaluation is only speculation.

Polyamia sp. females

There are at hand three different females from several Mexican localities which may represent the three previous species. As in the males, only genital characters provide adequate differences for separation. In the



Figs. 21–39. *Sanctanus vulpinus*: 21, distal portion of aedeagus shown ventrally; 22, dorsal view of connective and style; 23, lateral view of connective and aedeagus. *Polyamia gangamon*: 24, dorsal view of style; 25, distal portion of aedeagus shown ventrally; 26, lateral view of connective and aedeagus. *Deltocephalus trifax*: 27, ventral view of aedeagus; 28, distal portion of style shown ventrally; 29, lateral view of aedeagus. *Polyamia arachnion*: 30, lateral view of aedeagus; 31, distal portion of style shown ventrally; 32, ventral view of aedeagus. *Polyamia* sp.: 33, pregenital sternum; 34, ventral outline of first valvulae. *Polyamia* sp.: 35, pregenital sternum; 36, ventral outline of first valvulae. *Sanctanus lepidellus*: 37, distal portion of style shown ventrally; 38, lateral view of connective and aedeagus; 39, aedeagal apex shown ventrally.

first female (Figs. 33, 34), the pregenital sternum is concave posteriorly with a pair of irregular mesal teeth, and the bases of the first valvulae are sharply widened laterally. In the second female (Figs. 35, 36), the pregenital sternum is concave posteriorly with a sharp mesal tooth flanked by an additional highly inconspicuous tooth on either side, and the bases of the first valvulae diverge apically. In the third female (Figs. 12, 13), the pregenital sternum is barely concave with a single wide blunt mesal tooth, and the bases of the first valvulae are smoothly rounded laterally. No attempt is made at this time to associate these females with any male. Linnavuori, however, designated as allotype of *reticulata* a female with genital structures as shown in Figs. 12 and 13.

Deltocephalus xipei, new species

Length: 2.3 mm.

Coloration: Venter and legs dark brown touched with yellow on legs. Face dark brown with pale arcs on clypeus and yellowish areas on genae and lora. Crown stramineous to pale brown with only definite markings occurring on anterior margin as an irregular narrow dark-brown band. This band follows the curvature of the anterior coronal margin curving behind an ocellus on either side. The band is interrupted at the extreme apex and near each ocellus. A long series of specimens would probably show that the anterior coronal marking varies from a solid band to six distinct spots. Pronotum stramineous to pale brown and without definite markings. Scutellum stramineous to pale brown with mesal area darkened. Forewings milky-hyaline with most cells narrowly infuscated marginally except for heavier darkening of inner discal cells and adjacent costal margins.

Male genitalia: Aedeagus in lateral view simple with curvature near base, shaft straight, and a simple preapical appendage (Fig. 1). Aedeagus in ventral view rounded basally and with a pair of simple appendages near the notched apex (Fig. 3). Gonopore opens dorsally near apex (Fig. 4). Mesal lobes of style slender (Fig. 2).

Female genitalia: Female unknown.

Types: Holotype (USNM Type No. 66351) male, Ixmiquilpan, Mexico, 27 August 1936, E. D. Ball.

Discussion: This generic placement is based upon a broader definition of *Deltocephalus* than rendered by Oman (1949). The limits of *Deltocephalus* and related genera are the subject of a paper in preparation.

Deltocephalus delongi, new species

Length: 2.7 mm.

Coloration: Venter and legs dark brown touched lightly and variably with yellow. Face dark brown with genae and a few variable lines on clypeus, clypellus, and lora yellow. Crown stramineous, anterior margin with dark arcs (an extension of color from the face) and four black to brown spots, the mesal apical pair triangular and the lateral pair rounded (holotype with additional dark spot behind each ocellus connected to the lateral spot), a broken black transverse band between anterior margins of eyes

which is widest at middle of crown, narrowest near eyes, and broken at middle and near eyes (three breaks), additional ill-defined light-brown markings on coronal disc. Pronotum stramineous with some brown spotting anteriorly and color fading posteriorly. Scutellum stramineous marked variably with dark-brown anterior spots and lateral lines. Forewings and veins milky-hyaline with margins of cells lightly to moderately infuscated.

Male genitalia: Aedeagus in lateral view transverse with sharp basal heel and an avicephaliform apex (Fig. 16). Aedeagus in ventral view with gonopore opening at cleft apex (Fig. 14). Apex of aedeagus in dorsal view with a proximally notched rim (Fig. 17). Mesal lobe of style narrowing apically (Fig. 15).

Female genitalia: Pregenital sternum strongly concave with base of concavity nearly transverse.

Types: Holotype (USNM Type No. 66352), male and allotype female, Teotihuacan Pyramids 33 miles from Mexico City, Mexico, 19 August 1936, E. D. Ball. Both holotype and allotype are mounted on the same cardboard point.

Discussion: The generic placement of *delongi* is in accord with the definition of *Deltocephalus* rendered by Oman (1949). The species is named for Dwight M. DeLong, one of America's most outstanding workers in the Cicadellidae.

Deltocephalus trifax, new species

Length: 3.5–3.8 mm.

Coloration: Venter brown to dark brown touched with yellow. Legs stramineous to yellow banded with brown, banding most striking on femora of pro- and mesothoracic legs. Face yellow heavily marked with dark brown as arcs on clypeus, lines on sutures, and irregular spots under eyes, on genae, on lora, and on clypellus. Crown yellow with two pairs of brown spots on anterior margin, the middle pair are elongate, the lateral pair more or less rounded. An additional dark spot occurs behind each ocellus. The central portion of the coronal disc with an approximately pi-shaped black to tan marking on each side of the coronal suture. Both the shapes and colors of these markings vary greatly. The pronotum is light brown, yellow anteriorly, some irregular brown spots preapically, and with five pale narrow longitudinal stripes. Scutellum yellow with a few brown spots and lines. Forewings light brown hyaline, veins largely white, cells lightly infuscated marginally except outer apical cell, basal portion of inner discal cell, and adjacent costal area. All of these are solid dark brown. The costal vein is frequently distinctly yellow.

Male genitalia: Aedeagus in lateral view undistinguished except apically where the dorsum is expanded and irregularly toothed (Fig. 29). In ventral view the aedeagus is rounded basally, with truncated lateral expansions distally, and margin toothed on extreme apex (Fig. 27). The gonopore opens on the venter of the shaft at the base of a V-shaped notch (Fig. 27). Mesal lobe of style moderately long with inner margin irregular (Fig. 28).

Female genitalia: Pregenital sternum with posterior margin nearly truncated.

Types: Holotype (USNM Type No. 66353) male, Camaron, Panama, 17 July 1952, F. S. Blanton. Allotype female, Mojinga Swamp, Canal Zone, 9 January 1953, F. S. Blanton. Four paratypes: One, same data as holotype; one, Los Lajos, Panama, 26 October 1952, F. S. Blanton; one Madden Dam, Canal Zone, 21 October 1946, A. O. Meyer; and one, Margarita, Canal Zone, 25 August 1946, A. O. Meyer.

Discussion: See discussion of *Deltocephalus xipei*.

Sanctanus lepidellus (Stål), reinstated combination

Jassus (*Deltocephalus*) *lepidellus* Stål 1862: 53.

Deltocephalus lepidellus: Osborn 1924: 408, Plate 57, Fig. 1.

Sanctanus lepidellus: Oman 1938: 371.

Sanctanus lepidellus: Linnavuori 1954: 141, Fig. 13A.

Amplicephalus (*Nanctasus*) *lepidellus*: Linnavuori 1959: 100.

The generic placement of *lepidellus* has long troubled students of neotropical leafhoppers. Stål described the species from a unique Brazilian female (the original description erroneously recorded it as a male) and up to this time additional specimens were unknown. Through the splendid cooperation of Dr. E. Kjellander and the Stockholm Museum, Stål's type was loaned to me for study and comparison with the unique male reported below.

Length: 4 mm.

Coloration: Osborn has given a very detailed account of the color pattern of this species together with an outstandingly accurate habitus illustration. It is sufficient here to state that the male at hand agrees exactly with Stål's type and with Osborn's illustrations of the species.

Male genitalia: Aedeagus in lateral view a trifle bowed, slender, and tapering to a pointed apex with connective short (Fig. 38). Gonopore opening at base of forked apex (Fig. 39). Mesal lobe of style undistinguished (Fig. 37).

Specimens: Unique male São Paulo, Brazil, May 1954, N. L. H. Krauss.

Discussion: The type locality of *lepidellus* is the state of Rio de Janeiro, Brazil. This locality is near enough to São Paulo to afford additional proof for the correct association of the female and male of *lepidellus*. Linnavuori and Heller (1961: 7) described a male from Peru which they determined as *lepidellus*. I believe their determination was incorrect. Their specimen did not come from the type locality, and it appears to be too small to be properly associated with Stål's type. I refrain from giving their species a new name because the generic placement is uncertain. According to their illustrations (Pl. 4, Fig. 3), the species has a closed Y-shaped connective.

Sanctanus vulpinus, new species

Length: 3.8 mm.

Coloration: Venter dark brown irregularly touched with pale brown. Legs pale brown with prothoracic femora dark-brown banded, mesothoracic and metathoracic femora and tibiae mainly dark brown. Face pale brown washed irregularly with darker shades particularly on clypeus. Crown stramineous with a pair of dark minute crescent-shaped anterior marginal markings, a minute spot behind each ocellus, and a small darkened area at middle of hind margin. There is a pale orange band between the anterior margin of the eyes which is widest and broken mesally. Pronotum mainly orange with anterior margin changing to stramineous and posterior margin fading to translucent milky-white. Scutellum yellowish without definite markings. Forewings pale orange-brown hyaline, most veins in clavus and corium bright white although a few are orange. Most cells are narrowly infuscated at margins except for inner anteapical cell, inner apical cell, outer apical cell, and an undefined area at center of costal margin. All of these are heavily infuscated. The extreme apex of each wing is white.

Male genitalia: Aedeagus in lateral view slightly bowed and apex roundly enlarged with a straight basally directed process (Fig. 23). Aedeagus in posterior-ventral view with a pair of simple tapered processes closely appressed to the shaft and with the gonopore opening below the cleft apex (Fig. 21). Mesal lobe of style at apex subtruncated and strongly expanded laterally (Fig. 22).

Female genitalia: Female unknown.

Types: Holotype (USNM Type No. 34860) male, Jussaral, Angra-E. Do. Rio, Brazil, 9 October 1934, Travassos and Lopes.

Discussion: The generic placement of *vulpinus* is based upon DeLong's definition as stated in his revision of *Sanctanus* (DeLong and Hershberger, 1946). The coloration and male genitalia of *vulpinus* are similar to those in several Mexican species described by DeLong. The crown of most species of *Sanctanus* is flat to slightly concave. In *vulpinus* the crown is distinctly concave.

Bolotheta, new genus

Type-species: *Neocoelidia punctata* Osborn

Description: Head much narrower than pronotum and bluntly angled anteriorly, length of crown next to eyes much shorter than median length. Ocelli located on anterior margin of crown, one near each eye. Clypellus no wider distally than basally. Antennae about as long as entire length of body including forewings at rest. Scutellum very large, as long as pronotum. Venation of forewings fairly distinct with two apical and two subapical cells. Ground color pale yellowish with some dark brown or black markings. Male genitalia: Plates flat and triangular beset laterally with both uniserate setae and cilia. Valve distinct and triangular in shape. Pygofer with ventral processes. Connective closed Y-shaped and not fused

with aedeagus. Aedeagus moderately stout with large dorsal apodeme and subapical gonopore.

Bolotheta punctata (Osborn), new combination

1923. *Neocoelidia punctata* Osborn, 15 (1): 77.

Length: 6.5–7.0 mm.

Coloration: Basic ground color stramineous. Venter, legs, and face unmarked. One pair of moderately large dark-brown or black spots on anterior margin of crown. A single dark-brown spot at each posterior angle of pronotum. Scutellum with or without a pair of small preapical dark-brown spots. Forewings stramineous hyaline with markings as follows: portions bordering scutellum narrowly dark brown, commissural margins narrowly light brown with veins darker, and with a single moderately large black spot at center of each forewing.

Male genitalia: Pygofer in lateral view simple and without visible processes (Fig. 5); but in ventral view with partially crossed paired processes (Fig. 6); and in dorsal view with a preapical mesal projection (Fig. 7). Connective closed Y-shaped (Fig. 10) and not fused with aedeagus. Aedeagus in lateral view elongate with gonopore distinct (Fig. 11); in ventral view with sharp teeth on lateral margins (Fig. 8). Style undistinguished (Fig. 9).

Female genitalia: Female unknown.

Types: This species is known only from two males, the type and a paratype, both of which were collected in Province del Sara, Bolivia, and were deposited in the collection of the Carnegie Institute in Pittsburgh, Pennsylvania. The drawings were prepared from the genitalia of the holotype.

Discussion: Osborn's placement of *punctata* in *Neocoelida* is quite understandable. The exceedingly long antennae and the rather obscure venation of the forewings, both of which are characteristic of the Neocoelidiinae, are probably the features which influenced him. However, *punctata* lacks the typical antennal ledge of the Neocoelidiinae and has male genitalia characteristic of the Deltocephalinae. The exceedingly long antennae readily distinguish *Bolotheta punctata* from all other neotropical Deltocephalinae. This species was recognized as a deltocephaline by Kramer (1959: 30) with uncertain generic placement.

The Peruvian species, *Coelidiana rotundiceps*, described by Linnavuori and Heller (1961: 4) also belongs in *Bolotheta*. The generic transfer is made here: *Bolotheta rotundiceps* (Linnavuori and Heller) NEW COMBINATION. The exceedingly long antennae readily distinguish *Bolotheta* from all other neotropical Deltocephalinae.

KEY TO SPECIES OF *Bolotheta*

Male pygofer in lateral view without long terminal process (Fig. 5); dorsal portion of aedeagus more than half as long as shaft (Fig. 11) ---------- *punctata* (Osborn)

Male pygofer in lateral view with long terminal process (L. & H., 1961, Pl. 2, Fig. 7); dorsal portion of aedeagus half as long as shaft (L. & H., 1961, Pl. 2, Fig. 9) ..... *rotundiceps* (L. & H.)

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